

the **sellers**.¹¹⁰ This uncertainty may substantially affect the bargaining outcomes between buyers and sellers.¹¹¹ Finally, none of the cooperative solutions examined capture the effect of expectations of individual buyers or **sellers** on the gains that could **be** expected to be achieved from future trades in a given trading period.

A.7 Testing the Theoretical Predictions

In this section we review the experimental results in light of the predictions made using the cooperative game theory described above. In our basic treatment consisting of a capacity constraint on buyer purchases and unavoidable fixed costs, which corresponds to the experimental design in 15 of the experiments, **we** computed solution values for the Nash Bargaining Solution, the Shapley value and the Core. These values are shown in Tables A.2 through A.5. In Table 16 in the main body of the paper, we presented the average values of the **112** experimental data points that correspond to the basic treatment case (i.e., CAP, No MFN treatment).¹¹²

A comparison of Table 16 with Tables A.2 through A.5 reveals that the smallest sellers (#1 and #2) receive lower payoffs in the experiments than they do under either the Nash Bargaining Solution or the Shapley value predictions, but higher payoffs than any of the Core predictions. The largest seller (**#4**), on the other hand, does better in the experiments than is predicted by the Nash Bargaining Solution or Shapley value, though not as well as the best Core outcome. The buyers' payoffs **seem** to be broadly consistent with both the Nash Bargaining Solution and Shapley value outcomes, as **well** as with the average of the extreme Core outcomes.

In order to provide a more quantitative estimate of the predictive power of the cooperative game solutions, we computed an average distance measure between the

¹¹⁰ MVPDs also enter the bargaining game with some costs.

¹¹¹ Because of this uncertainty, trading outcomes may be due, in part, to the expectations that buyers and sellers have regarding the prices at which future trades may take place and their willingness to assume risk. **An** important issue for the development of a more complete theory involves the proper method of introducing expectation formation and risk into the theory.

¹¹² As noted earlier, substantial **care must** be taken in interpreting these results. With the exception of Buyer #5 (i.e., the **DBS** operator), the market share accounted for by a given buyer changes across treatments. This problem does not exist with sellers, given that their size remains constant across concentration treatments.

theoretical solution and the set of experimental data points.¹¹³ These distance statistics are reported in Table A.8 for the three solution concepts. This table reveals that the Nash Bargaining Solution offers the best “fit” to the data, with the Shapley value a close second. The average of the Core outcomes is less predictive overall than the more “cooperative” solutions, but the Core does capture the fact that small **sellers** suffer relative to large sellers in this market environment, albeit in a more extreme manner than the experiments revealed.

Treatment	Nash Bargaining Solution	Shapley Value	Average of Core Outcomes
High/Low	1842	1896	2122
High/High	1805	1919	2305
Low/High	2379	2510	2999

Table A.8: Average Distance of Cooperative Solutions from Experimental Data Points

A.8 Summary of the Theoretical Results

The examined solution concepts provide the following insights. In the presence of a trading constraint and where competition among sellers is strong (as in the case of the Core), sellers incur losses. In instances where competition is not as strong (as in the Nash Bargaining solution and Shapley value), sellers could conduct a **set** of trades that allows them to more than cover their costs. Importantly, all solution concepts predict that the welfare of sellers is not affected by the degree of concentration among buyers. In instances where competition among sellers is strong, as when capacity constraints are in effect, small sellers can expect to lose money uniformly whatever the level of concentration on the buy side of the market. Finally, we have shown that the amount of surplus a buyer and seller achieve in trade depends upon the degree to which the sellers’ costs are avoidable.

¹¹³ That is, we computed the Euclidean distance between each theoretical solution and each of the data points representing net surplus achieved in a trading period. We then summed these values and divided by the number of observations

It is worth noting that from a computational point of view it would be possible to impose a capacity constraint on the number of trades that each **seller** is permitted to *make* in any trading period. Following this logic would reveal that such a constraint would work to the advantage of the **sellers** in exactly the same way as the trading constraint on buyer trades works to the advantage of buyers. However, in the bargaining framework between cable operators and cable programming networks, a constraint on **seller** transactions is not plausible for a number of reasons. In contrast to the natural constraint on channel capacity that cable operators face, for any given cable delivery technology, **there** is no corresponding constraint on the number of cable operators a given cable network can **sell** to. For **sellers**, the marginal cost of selling to an additional buyer is essentially **zero**.

Even if channel capacity can be viewed as unlimited based on available delivery technologies (e.g., through digital technologies and fiber **delivery** systems), cable networks ultimately compete for cable subscribers' viewing time. Hence, cable networks are inherently substitute products from a cable operator's point of view. **At** some point the camage of an additional cable network will reduce the advertising revenue earned by cable networks and cable operators. This reduction in revenue will, at some point, exceed the additional subscriber revenue earned by cable operators from carrying an additional cable network. **These** economic effects occur even if the cable operator has unlimited channel capacity. The relevant constraint is the cable subscribers' viewing time.

Finally, any given cable operator can make a strategic decision to limit the number of cable networks that it chooses to **carry**, without obtaining the cooperation of other cable operators. In contrast, given the substitutability of cable networks, any attempt by **the** cable networks to limit the number of programs sold by each network for strategic reasons would require a coordinated action by all networks.

Appendix B: Subject Instructions

Experiment Instructions – Buyers (**No**Cap, **No** MFN)

I. Procedures and Asset Description

You are about to participate in an experiment in the economics of market decision making in which you will earn money based on the decisions you make. Your earnings are yours to keep and will be paid to you in cash at the end of the experiment. During the experiment all units of account will be in experimental dollars. Upon conclusion of the experiment, all experimental dollars earned will be converted into U.S. dollars at the conversion rate of _____ U.S. dollars per experimental dollar. Your earnings, plus a lump sum amount of \$7, will be paid to you in private. You are not allowed to communicate with the other participants, except as permitted under the rules of the experiment. If you have any questions, please raise your hand and I will answer them in private.

In this market experiment you will have the opportunity to buy and/or sell a set of fictitious assets. The assets are “fictitious” in that they only exist in the context of the experiment. You will be assigned, at the beginning of the experiment, a “bidder” number and a role as either a buyer or a seller. To simulate the financial benefits of acquiring an asset, buyers will be assigned a guaranteed “resale” value for each asset. Resale values may differ across assets for a given buyer and may differ across buyers. Buyers will also be assigned a previously incurred “fixed cost” for participating in the market. Sellers will be assigned a particular asset and a previously incurred “fixed cost” from creating that asset. Sellers will also be assigned a schedule of payments that a third party provides them in the event of a trade between a seller and a buyer.

Buyers have the opportunity to purchase an asset from different sellers, while sellers have the opportunity to sell their respective assets to multiple buyers. From this point forward, you will be referred to by your bidder number, which is bidder number _____. You are a BUYER in this experiment. There are four sellers and five buyers in your market.

II. Earnings

Participants have the opportunity to conduct trades during a series of independent trading periods. Buyers earn money by purchasing assets at prices below their assigned resale value that exceed their fixed cost. Sellers earn money by selling their assigned assets to one or more buyers at prices, when combined with a third party payment that exceed their fixed cost. The following section describes how you calculate your earnings.

1. Instructions for Buyers

Each buyer has the opportunity to buy a single asset from each of the four sellers (labeled Seller 1, 2, 3, and 4). You will be assigned a resale value for each potential trade. Resale values may differ among buyers. You are strictly prohibited from revealing your resale values to anyone. While you can conduct a trade with any seller during a trading period, you may only complete ____ trades in a given period. If you buy an asset from a seller, your earnings from the trade are equal to the difference between your resale value for that asset and the price you paid for the asset. That is:

$$\text{TRADE EARNINGS} = \text{RESALE VALUE} - \text{PURCHASE PRICE}$$

Suppose, for example, that you traded with Seller 1 and that your assigned resale value for this asset is **644** experimental dollars. If you pay **300** experimental dollars for a trade with Seller 1, then your earnings are:

$$\text{TRADE EARNINGS} = 644 - 300 = 344 \text{ experimental dollars}$$

Your total profits in any trading period are equal to the sum of your earnings from all trades minus your fixed cost.

$$\text{TOTAL PROFITS} = \text{SUM OF TRADE EARNINGS} - \text{FIXED COST}$$

For example, suppose your fixed cost was 110. Suppose that during the same trading period you traded with Seller 2 and that your assigned resale value for this asset is 120 experimental dollars. If you pay 70 experimental dollars, then your total earnings in that trading period are:

$$\text{SUM OF } \mathbf{TRADE} \text{ EARNINGS} = 344 + 50 = 394 \text{ experimental dollars}$$

$$\text{TOTAL PROFITS} = 394 - 110 = 284 \text{ experimental dollars}$$

The following record sheet, which you should always use to calculate and record your earnings from each trade, displays your total earnings in this trading period.

Trading Period	Trade	Seller	Resale Value	- PRICE	= Earnings
	1	1	644	300	344
	2	2	120	70	50
	3				
	4				
	-Fixed Costs				-110
	TOTAL				284

You incur a loss on any particular trade if the price you paid for an asset exceeds your assigned resale value for that asset. You incur a loss in a trading period if the sum of your trade earnings does not exceed your fixed costs. You begin the experiment with _____ experimental dollars in working capital. If your losses ever exceed that amount, you will be paid your \$7 show up fee and will be asked to leave the experiment.

2. Information on Sellers

Each seller has the opportunity to sell a single asset to each of the five buyers (labeled Buyer 5, 6, 7, 8, and 9). Before the trading period, sellers will be assigned one of the assets and a fixed cost. The level of the assigned fixed costs may differ across assets. The asset is “non-depletable” in that its sale to one buyer does not diminish the amount of the asset available for sale to another buyer. Therefore, sellers are free to sell to one or more buyers. However, sellers may only trade with each buyer only once in a trading period.

The sale of an asset to any buyer conveys a financial benefit to a third party, a portion of which is transferred to the seller in the form of a fixed payment the level of which is known only by the seller. This third party payment augments the revenue the seller obtains from selling the asset to a buyer.

Seller earnings from a trade are equal to the sale price, augmented by the third-party payment. That is:

$$\text{TRADE EARNINGS} = \text{SALE PRICE} + \text{THIRD PARTY PAYMENT}$$

While you do not know the exact size of the third party payment any seller receives, you can reasonably infer that sellers for whom you have a higher resale value are likely to have higher third party payments, and sellers from whom you have a lower resale value are likely to have lower third party payments.

III. Trading Process

(NOTE: A COMPUTER SCREEN SHOT IS PROVIDED FOR YOUR REFERENCE)

Trading occurs in a series of independent trading days or periods. Each period will last 6 minutes. Buyers and sellers have the opportunity to conduct a set of trades through a series of bilateral negotiations. A buyer may submit a bid to buy a particular seller’s asset by entering a bid into the computer and identifying to whom the bid is

offered. A buyer can place a bid by typing a bid amount in the “Price” box located in the center of the screen and typing the number of the seller (1, 2, 3, or 4) to whom the bid is offered in the “Offered To” box located immediately below the Price box. A buyer submits the bid by pressing the “PLACE B I D button. Each bid can be sent to only ONE seller, and only that seller will see the bid. A bid indicates that the buyer is willing to accept any price at or below that amount. Similarly, a seller may submit offers to sell its asset to a particular buyer by entering an asking price (“ASK”) into the computer and identifying to whom the ask is offered. Each ask can be sent to only ONE buyer, and only that buyer will see the bid. An ask indicates that the seller is willing to sell at any price at or above that amount

A buyer can accept an initial ask, or a seller can accept an initial bid. The bids and asks can be seen on the right hand corner of the screen. The bids placed by you are in the upper right hand corner along with the identity of whom they were offered to. The asks that have been offered to you by various sellers can be seen in the lower right hand corner along with the identity of the seller making the offer. As a buyer, you accept an ask by highlighting the ask you wish to accept with your mouse and then pressing the “buy” button. If neither an initial bid nor an ask is accepted, a buyer may increase its standing bid and/or a seller may decrease its standing offer. A buyer’s revised bid must exceed its standing bid to that seller, while a seller’s revised offer must be lower than its standing ask to that buyer. As long as the period is open, participants are allowed to submit as many bids and asks as they like. If either side accepts one of the bids or asks, the two participants complete a trade at the designated price and record the trade on their record sheet. Once you have traded with a particular seller in a period, you may not trade with them again during this period.

Information on completed trades can be seen in the upper center portion of the screen and in the lower left hand corner of the screen. The upper center portion reports the most recent trade you have completed and the lower left hand corner shows all trades this period. It is important for you to pay attention to these screens as a seller may accept one of your bids causing a trade to be completed with you.

In order to make sure you understand the instructions, please complete the following exercise. Once you are finished (or if you have a question), raise your hand and someone will come by to help you.

Consider the following resale values and fixed costs:

Fixed Costs	25
seller	Resale Value
1	30
2	40
3	50
4	70

1. Suppose you placed a bid to buy from Seller 2 at a price of 12. If that bid is accepted, what would be your earnings on the trade?

2. If that **is** your only trade, what would be your total profits?

3. Suppose that Seller 3 offered an ask of **44** to you. If you accepted the ask, what would be your earnings on the trade?

4. If Seller 3's third party payment was 120 for the trade, what would have been Seller 3's earnings on the trade?

5. How many times may you trade with each seller in a period?

RAISE YOUR HAND WHEN FINISHED

Period **zero** will be a practice period. You will receive no earnings for this practice period. If you have any questions, please raise your hand and I will come by to answer your question.

Are there any questions?

Experiment Instructions – Sellers (No Cap, No MFN)

I. Procedures and Asset Description

You are about to participate in an experiment in the economics of market decision making in which you will earn money based on the decisions you make. Your earnings are yours to keep and will be paid to you in cash at the end of the experiment. During the experiment all units of account will be in experimental dollars. Upon conclusion of the experiment, all experimental dollars earned will be converted into U.S. dollars at the conversion rate of _____ U.S. dollars per experimental dollar. Your earnings, plus a lump sum amount of \$7, will be paid to you in private. You are not allowed to communicate with the other participants, except as permitted under the rules of the experiment. If you have any questions, please raise your hand and I will answer them in private.

In this market experiment you will have the opportunity to buy and/or sell a set of fictitious assets. The assets are “fictitious” in that they only exist in the context of the experiment. You will be assigned, at the beginning of the experiment, a “bidder” number and a role as either a buyer or a seller. To simulate the financial benefits of acquiring an asset, buyers will be assigned a guaranteed “resale” value for each asset. Resale values may differ across assets for a given buyer and may differ across buyers. Buyers will also be assigned a previously incurred “fixed cost” for participating in the market. Sellers will be assigned a particular asset and a previously incurred “fixed cost” from creating that asset. Sellers will also be assigned a schedule of payments that a third party provides them in the event of a trade between a **seller** and a buyer.

Buyers have the opportunity to purchase one or more assets from the sellers, while sellers have the opportunity to sell their respective assets to one or more buyers. From this point forward, you will be referred to by your bidder number, which is bidder number _____. You are a **SELLER** in this experiment. There are four sellers and five buyers in your market.

II. Earnings

Participants have the opportunity to conduct trades during a series of independent trading periods. Buyers earn money by purchasing assets at prices below their assigned resale value that exceed their fixed cost. Sellers earn money by selling their assigned assets to one or more buyers at prices, when combined with a third party payment that exceed their fixed cost. The following section describes how you calculate your earnings.

1. Instructions for Sellers

Each seller has the opportunity to sell a single asset to each of the four buyers (labeled Buyer 5, 6, 7, 8, and 9). Before the trading period, you will be assigned one of the assets and a fixed cost. The level of the assigned fixed costs may differ across assets. You are not permitted to reveal your assigned fixed cost to anyone. The asset is “non-depletable” in that its sale to one buyer does not diminish the amount of the asset available for sale to another buyer. Therefore, you are free to sell your asset to one or more buyers. However, you may only trade with each buyer only once in a trading period.

The sale of your asset to any buyer conveys a financial benefit to a third party, a portion of which is transferred to you in the form of a fixed payment the level of which is known only by you. This third party payment augments the revenue you obtain from selling your asset to a buyer. The following is an example:

Buyer	Third Party Payment
5	30
6	40
7	50
8	70
9	22

If you sell your asset to a buyer, your earnings from the trade, which are yours to keep, is equal to the sale price augmented by the third-party payment. That is:

$$\text{TRADE EARNINGS} = \text{SALE PRICE} + \text{THIRD PARTY PAYMENT}$$

Suppose, for example, that you are assigned a fixed cost of 200 experimental dollars. Suppose, Buyer 5 agrees to pay you 220 experimental dollars for this asset, then your earnings on this trade are equal to:

$$\text{TRADE EARNINGS} = 220 + 30 = 250.$$

Your total profits in any trading period are equal to the sum of your earnings from all trades minus your fixed cost.

$$\text{TOTAL PROFITS} = \text{SUM OF TRADE EARNINGS} - \text{FIXED COST}$$

Suppose that during the same trading period you traded with Buyer 6 and that your assigned third party payment for this trade is 40 experimental dollars. If Buyer 6 agrees to pay you 70 experimental dollars, then your total profits in that trading period are:

$$\text{SUM OF TRADE EARNINGS} = 250 + 110 = \mathbf{360} \text{ experimental dollars}$$

$$\text{TOTAL PROFITS} = 360 - 200 = 160 \text{ experimental dollars}$$

The record sheet shown below shows the transactions. Please use the enclosed record sheet to calculate and record your earnings during each trading period.

Trading Period	Trade	Buyer	PRICE	+ Third Party	= Earnings
1	-Fixed Costs				-200
	1	5	220	30	250
	2	6	70	40	110
	3				
	4				
	5				
	TOTAL				

You will incur a loss in the trading period if you do not generate enough revenue to cover your fixed costs. Please note that you will incur a loss on a particular trade if you agree to pay a buyer a price that exceeds the payment you receive from a third party from making that trade. You begin the experiment with _____ experimental dollars in working capital. If your losses ever exceed that amount, you will be paid your \$7 show up fee and be asked to leave the experiment.

III. Trading Process

(NOTE: A COMPUTER SCREEN SHOT IS PROVIDED FOR YOUR REFERENCE)

Trading occurs in a series of independent trading days or periods. Each period will last 6 minutes. Buyers and sellers have the opportunity to conduct a set of trades through a series of bilateral negotiations. A buyer may submit a bid to buy a particular seller's asset by entering a bid into the computer and identifying to whom the bid is offered. Each bid can be sent to only ONE seller, and only that seller will see the bid. A bid indicates that the buyer is willing to accept any price at or below that amount. Similarly, a seller may submit offers to sell its asset to a particular buyer by entering an asking price ("ASK") into the computer and identifying to whom the ask is offered. A seller can place an ASK by typing an ask amount in the "Price" box located in the center of the screen and typing the number of the buyer (5, 6, 7, 8, or 9) to whom the ask is

offered in the “Offered To” box located immediately below the Price box. A seller submits the ask by pressing the “PLACE A S K button. Each ask can be sent to only ONE buyer, and only that buyer will see the bid. An ask indicates that the seller is willing to sell at any price at or above that amount.

A buyer can accept an initial **ask**, or a seller can accept an initial bid. The bids and **asks** can be seen on the right hand side of the screen. The asks placed by you are in the lower right hand side along with the identity of who they were offered to. The bids that have been offered to you by various buyers can be seen in the upper right hand side along with the identity of buyer making the offer. As a seller, you accept a bid by highlighting the bid you wish to accept with your mouse and then pressing the “sell” button. If neither an initial bid nor an ask is accepted, a buyer may increase its standing bid and/or a seller may decrease its standing offer. A buyer’s revised bid must exceed its standing bid to that seller, while a seller’s revised offer must be lower than its standing ask to that buyer. As long as the period is open, participants are allowed to submit as many bids and asks as they like. If either side accepts one of the bids or asks, the two participants complete a trade at the designated price and record the trade on their record sheet. Once you have traded with a particular seller in a period, you may not trade with them again during this period.

Information on completed trades can be seen in the upper center portion of the screen and in the lower left hand side of the screen. The upper center portion reports the most recent trade you have completed and the lower left hand side shows all trades this period. It is important for you to pay attention to these screens as a buyer may accept one of your asks causing a trade to be completed with you.

In order to make sure you understand the instructions, please complete the following exercise. Once you are finished (or if you have a question), raise your hand and someone will come by to help you.

Consider the following resale values and fixed costs:

Fixed Costs	225
Buyer	Third Party Payment
5	44
6	70
7	52
8	122
9	34

1. Suppose you placed an ask to sell to Buyer 6 at a price of 12. If that ask was accepted, what would be your earnings on the trade?
2. If that was your only trade, what would be your total profits?
3. Suppose that Buyer 5 offered a bid of 20 to you. If you accepted the bid, what would be your earnings on the trade?
4. How many times may you trade with each buyer in a period?

RAISE YOUR HAND WHEN FINISHED

Period zero will be a practice period. You will receive no earnings for this practice period. If you have any questions, please raise your hand and I will come by to answer your question.

Are there any questions?

Experiment Instructions - Buyers (Cap, MFN)

I. Procedures and Asset Description

You are about to participate in an experiment in the economics of market decision making in which you will earn money based on the decisions you make. Your earnings are yours to keep and will be paid to you in cash at the end of the experiment. During the experiment all units of account will be in experimental dollars. Upon conclusion of the experiment, all experimental dollars earned will be converted into U.S. dollars at the conversion rate of _____ U.S. dollars per experimental dollar. Your earnings, plus a lump sum amount of \$7, will be paid to you in private. You are not allowed to communicate with the other participants. If you have any questions, please raise your hand and I will answer them in private.

In this market experiment you will have the opportunity to buy and/or sell a set of fictitious assets. The assets are “fictitious” in that they only exist in the context of the experiment. You will be assigned, at the beginning of the experiment, a “bidder” number and a role as either a buyer or a seller. To simulate the financial benefits of acquiring an asset, buyers will be assigned a guaranteed “resale” value for each asset. Resale values may differ across assets for a given buyer. Buyers vary in “size,” which is measured by the number of customers it serves. The larger the buyer, the higher its assigned resale value for an asset. The following table ranks buyers from largest to smallest and provides the number of customers served.

Buyer	Customers (<i>Size Rank</i>)
6	36 (1)
5	32 (2)
7	14 (3)

In a given trading period a seller may conduct trades with multiple buyers. In each trading period the two largest buyers (i.e., Buyer 6 and Buyer 5) are guaranteed to receive the lowest price from the sellers with whom they trade. Specifically, if either

Buyer 6 or Buyer 5 agrees on a price that is higher than the price the seller agrees to conduct a trade with another buyer, each of these buyers get the lower price. In addition, Buyer 6 and Buyer 5 each receive the same price.

Buyers will also be assigned a previously incurred “fixed cost” for participating in the market. These fixed costs may differ among buyers. At the beginning of the experiment sellers will be assigned a particular asset and a previously incurred “fixed cost” from creating that asset. These fixed costs may differ among sellers. Sellers will also be assigned a schedule of payments that a third party provides them in the event of a trade between a seller and a buyer. The larger the buyer, the higher the third party payment received by the seller. The level of the third party payment a given seller receives from a trade will vary across sellers. Buyers have the opportunity to purchase an asset from different sellers, while sellers have the opportunity to sell their respective assets to multiple buyers. Each buyer is limited to making three trades per trading period. You are a BUYER in this experiment. From this point forward, you will be referred to by your number, which is number _____. There are four sellers and three buyers in your market.

II. Earnings

Participants have the opportunity to conduct trades during a series of independent trading periods. Buyers earn money by: (1) purchasing assets at prices below their assigned resale value for those assets and (2) having the sum of these earnings exceed their assigned fixed cost. Sellers earn money by selling their assigned assets to one or more buyers at prices that, when combined with a third party payment, exceed their fixed cost. The following section describes how you calculate your earnings.

1. Instructions for Buyers

Each buyer has the opportunity to buy an asset from one or more sellers. The market includes four sellers (labeled Seller 1, 2, 3, and 4). You will be assigned a resale value for the asset sold by each seller. You are strictly prohibited from revealing your

resale values to anyone. While you can conduct a trade with any seller during a trading period, you may only complete **3** trades in a given period. You may trade with a particular seller only once in a trading period. If you buy an asset, your earnings from the trade are equal to the difference between your resale value for that asset and the price you paid for the asset. That is:

$$\text{TRADE EARNINGS} = \text{RESALE VALUE} - \text{PURCHASE PRICE}$$

Suppose, for example, that you traded with Seller 1 and that your assigned resale value for the purchased asset is 244 experimental dollars. Suppose further that you serve 20 customers. If you pay 4.0 experimental dollars/customer or, a total of 80 experimental dollars ($4.0 * 20$ customers) for Seller 1's asset, then your earnings are:

$$\text{TRADE EARNINGS} = 244 - 80 = \mathbf{164} \text{ experimental dollars}$$

Your total profits in any trading period are equal to the sum of your earnings from all trades minus your fixed cost.

$$\text{TOTAL PROFITS} = \text{SUM OF TRADE EARNINGS} - \text{FIXED COST}$$

For example, suppose your fixed cost was 110. Suppose that during the same trading period you traded with Seller 2 and that your assigned resale value for the purchased asset is 120 experimental dollars. If you pay a price of 2.0 experimental dollars per customer, or 40 total experimental dollars ($= 2.0 * 20$), then your total earnings in that trading period are:

$$\text{SUM OF EARNINGS} = (\mathbf{244} - 80) + (120 - 40) = 244 \text{ experimental dollars}$$

$$\text{TOTAL PROFITS} = 244 - 110 = 134 \text{ experimental dollars}$$

The following record sheet, which you should always use to calculate and record your earnings from each trade, displays your total earnings in this trading period.

							Earnings =	
							Resale	
Trading			Resale	Price		Total	Value –	
Period	Trade	Seller	Value	Per Customer	Customers	Price	Total Price	
1	1	1	244	4.0	x 20	80	164	
	2	2	120	2.0		40	80	
	3							
	- Fixed Costs							- 110
	TOTAL							134

You incur a loss on a trade if the price you paid for an asset exceeds your assigned resale value for that asset. You incur a loss in a trading period if the sum of your trade earnings is less than your fixed costs. If you are either Buyer 6 or Buyer 5 you may obtain additional earnings because the seller(s) with whom you have traded may have activated the provision that guarantees that you pay, expressed on a price/customer basis, no more than any smaller buyer. You will be informed at the end of each trading period whether you have obtained additional earnings because of the activation of this guarantee. You begin the experiment with _____ experimental dollars in working capital. If your losses ever exceed that amount, you will be paid your \$7 show up fee and you will be asked to leave the experiment.

2. Information on Sellers

Each seller has the opportunity to sell a single asset to each of the five buyers (labeled Buyer 5, 6, and 7). Each asset is “non-depletable” in that its sale to one buyer does not diminish the amount of the asset available for sale to another buyer. Therefore,

sellers are free to sell to one or more buyers. However, sellers may trade with each buyer only once in a trading period.

The sale of an asset to any buyer conveys a financial benefit to a third party, a portion of which is transferred to the seller in the form of a fixed payment the exact level of which is known only by the seller. This third party payment augments the revenue the seller obtains from selling the asset to a buyer. The larger the buyer, the higher the third-party payment received by the seller.

Seller earnings from a trade are equal to the sale price, augmented by the third-party payment. That is:

$$\text{TRADE EARNINGS} = \text{SALE PRICE} + \text{THIRD PARTY PAYMENT}$$

III. Trading Process

(NOTE: **A** COMPUTER SCREEN SHOT **IS** PROVIDED FOR YOUR REFERENCE)

Trading occurs in a series of independent trading days or periods. Each period will last 6 minutes. Buyers and sellers have the opportunity to conduct a set of trades through a series of bilateral negotiations. A buyer may submit a bid to buy a particular seller's asset by entering a bid into the computer and identifying to whom the bid is offered. A buyer can place a bid by typing a bid amount in the "Price" box located in the center of the screen and typing the number of the seller (1, 2, 3, or **4**) to whom the bid is offered in the "Offered To" box located immediately below the Price box. A buyer submits the bid by pressing the "PLACE B I D button. Each bid can be sent to only ONE seller, and only that seller will see the bid. A bid indicates that the buyer is willing to accept any price at or below that amount. Similarly, a seller may submit offers to sell its asset to a particular buyer by entering an asking price ("ASK") into the computer and identifying to whom the ask is offered. Each ask can be sent to only ONE buyer, and only that buyer will see the bid. **An** ask indicates that the seller is willing to sell at any price at or above that amount.

A buyer can accept an initial ask, or a seller can accept an initial bid. The bids and asks can be seen on the right hand corner of the screen. The bids placed by you are in the upper right hand corner along with the identity of the sellers to whom they are offered. The asks that have been offered to you by various sellers can be seen in the lower right hand corner along with the identity of seller making the offer. **As** a buyer, you accept an ask by highlighting the ask you wish to accept with your mouse and then pressing the “buy” button. If neither an initial bid nor an ask is accepted, a buyer may increase its standing bid and/or a seller may decrease its standing offer. **A** buyer’s revised bid must exceed its standing bid to that seller, while a seller’s revised offer must be lower than its standing ask to that buyer. **As** long as the period is open, participants are allowed to submit as many bids and asks as they like. If either side accepts one of the bids or asks, the two participants complete a trade at the designated price and should record the trade on their record sheet. Once you have traded with a particular seller in a period, you may not trade with that seller again during this period.

Information on completed trades can be seen in the upper center portion of the screen and in the lower left hand corner of the screen. The upper center portion reports the most recent trade you have completed and the lower left hand corner shows all trades this period. It is important for you to pay attention to these screens as a seller may accept one of your bids resulting in a trade with you.

In order to make sure you understand the instructions, please complete the following exercise. Once you are finished (or if you have a question), raise your hand and someone will come by to help you.

Consider the following resale values, customers served, and fixed costs:

Trading Period	Trade	Seller	Resale Value	Price Per Customer	Customers	Total Price	Earnings = Resale Value - Total Price
1	1	1	40		x 20		
	2	2	70				
	3	3	90				
	- Fixed Costs						- 25
TOTAL							

1. Suppose you placed a bid to buy from Seller 2 at a price of 2.0 per customer. If that bid is accepted, what would be your earnings on the trade?
2. If that is your only trade, what would be your total profits?
3. Suppose that Seller 3 offered an ask of 3.0 per customer to you. If you accepted the ask, what would be your earnings on the trade?
4. If Seller 3's third party payment was 50 for the trade, what would have been Seller 3's earnings on the trade?
5. How many times may you trade with each seller in a period?

RAISE YOUR HAND WHEN FINISHED

Period zero will be a practice period. You will receive no earnings for this practice period. If you have any questions, please raise your hand and I will come by to answer your question(s).

Are there any questions?

Experiment Instructions – Sellers (Cap, MFN)

I. Procedures and Market Description

You are about to participate in an experiment in the economics market decision making in which you will earn money based on the decisions you make. Your earnings are yours to keep and will be paid to you in cash at the end of the experiment. During the experiment all units of account will be in experimental dollars. Upon conclusion of the experiment, all experimental dollars earned will be converted into U.S. dollars at the conversion rate of _____ U.S. dollars per experimental dollar. Your earnings, plus a lump sum amount of \$7, will be paid to you in private. You are not allowed to communicate with the other participants. If you have any questions, please raise your hand and I will answer them in private.

In this market experiment you will have the opportunity to buy and/or sell a set of fictitious assets. The assets are “fictitious” in that they only exist in the context of the experiment. You will be assigned, at the beginning of the experiment, a “bidder” number and a role as either a buyer or a seller. To simulate the financial benefits of acquiring an asset, buyers will be assigned a guaranteed “resale” value for each asset. The level of the resale value assigned to any buyer is related to the buyer’s “size,” which is measured by the number of customers it serves. The larger the buyer, the higher its assigned resale value for an asset. Resale values may differ across assets for a given buyer. The following table ranks buyers included in the experiments from largest to smallest and provides the number of customers served.

Buyer	Customers (Size Rank)
7	42 (1)
9	14 (2)
5	11 (3)
6	9 (4)
8	6 (5)

In a given trading period a seller may conduct trades with multiple buyers. In each trading period the largest buyer (i.e., Buyer 7) is guaranteed to receive the lowest price from the sellers with whom it trades. Specifically, if Buyer 7 agrees on a price that is higher than the price the seller agrees to conduct a trade with another buyer, Buyer 7 is guaranteed to receive the lower price.

Sellers will be assigned a particular asset and a schedule of payments that a third party provides to them in the event of a trade between a seller and a buyer. The larger the buyer, the higher the third-party payment. Buyers have the opportunity to purchase an asset from different sellers, but each buyer is limited to making three trades per trading period. Sellers have the opportunity to sell their respective assets to multiple buyers. Both buyers and sellers will be assigned a previously incurred “fixed cost” for participating in the market, which are different for each buyer and for each seller.

You are a SELLER in this experiment. From this point forward you will be referred to by your seller number, which is seller number _____. There are **four** sellers and **five** buyers in your market.

II. Earnings

Participants have the opportunity to conduct trades during a series of independent trading periods. Buyers earn money by: (1) purchasing assets at prices below their assigned resale value for those assets; and (2) having the sum of these earnings exceed their assigned fixed cost. Sellers earn money by selling their assigned assets to one or more buyers at prices that, when combined with a third party payment, exceed their assigned fixed cost. The following section describes how you calculate your earnings.

1. Instructions for Sellers

Each seller has the opportunity to sell a single asset to each of the five buyers (labeled Buyer 5, 6, 7, 8, and 9). Before the trading period, you will be assigned an asset and a fixed cost. You are not permitted to reveal your assigned fixed cost to anyone. The asset is “non-depletable” in that its sale to one buyer does not diminish the amount of the